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Focke et al.

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[54] **PROCESS AND APPARATUS FOR CONVEYING LABELS TO BE TRANSFERRED TO A (CIGARETTE) PACK**

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[51] **Int. Cl.**[5] **B65C 9/00**
[52] **U.S. Cl.** **156/566**; 156/353; 156/354; 156/570; 156/571; 83/94; 83/165
[58] **Field of Search** ..... 156/353, 354, 566, 567, 156/568, 570, 571, 573, DIG. 28, DIG. 29, DIG. 30, DIG. 31; 83/93, 94, 165; 271/145, 165

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[57] **ABSTRACT**

Labels (**10**), especially revenue stamps, are usually affixed to cuboidal cigarette packs (**11**). The labels have to be supplied and held ready for being received by the packs (**11**) in sufficient numbers. The labels (**10**) are successively severed length- or breadthways from a continuous web of material (**17**) and are then directly fed into a magazine (**14**), from which the labels are extracted at the lower end as required. Without any conversion, the type of labels to be processed can be changed by way of (temporarily) manually inserting labels into the magazine which is appropriately designed for this option.

10 Claims, 7 Drawing Sheets

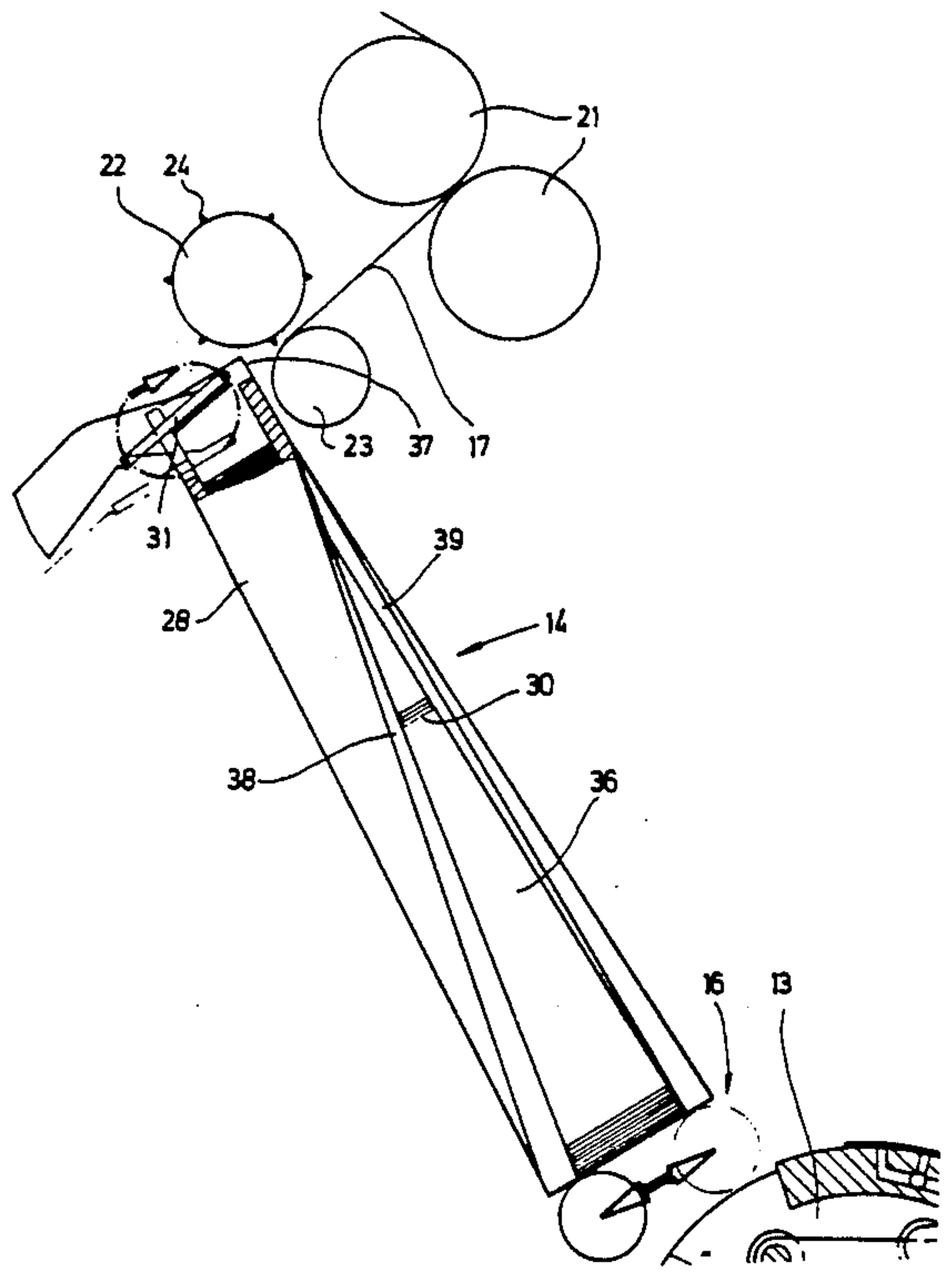
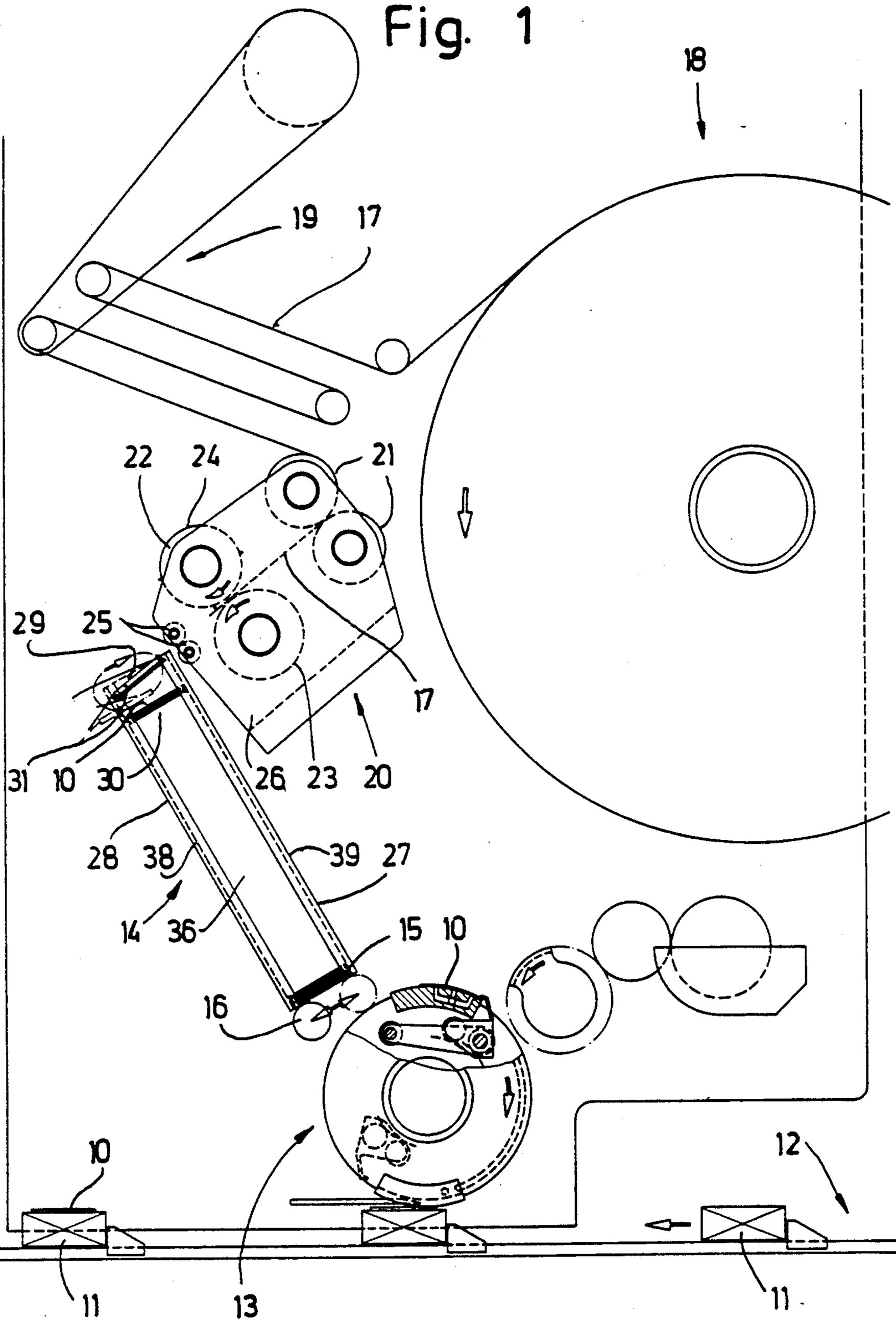


Fig. 1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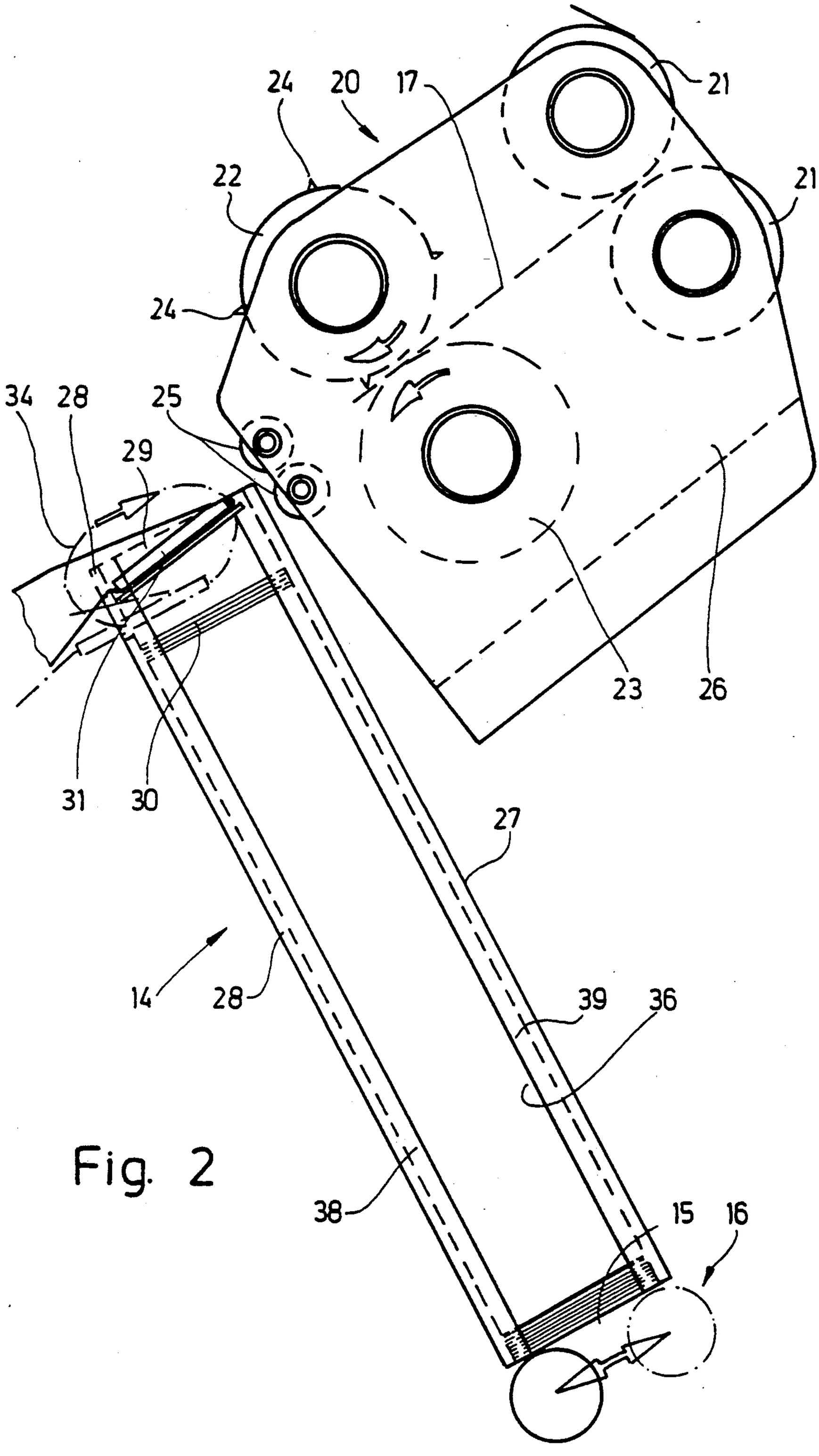
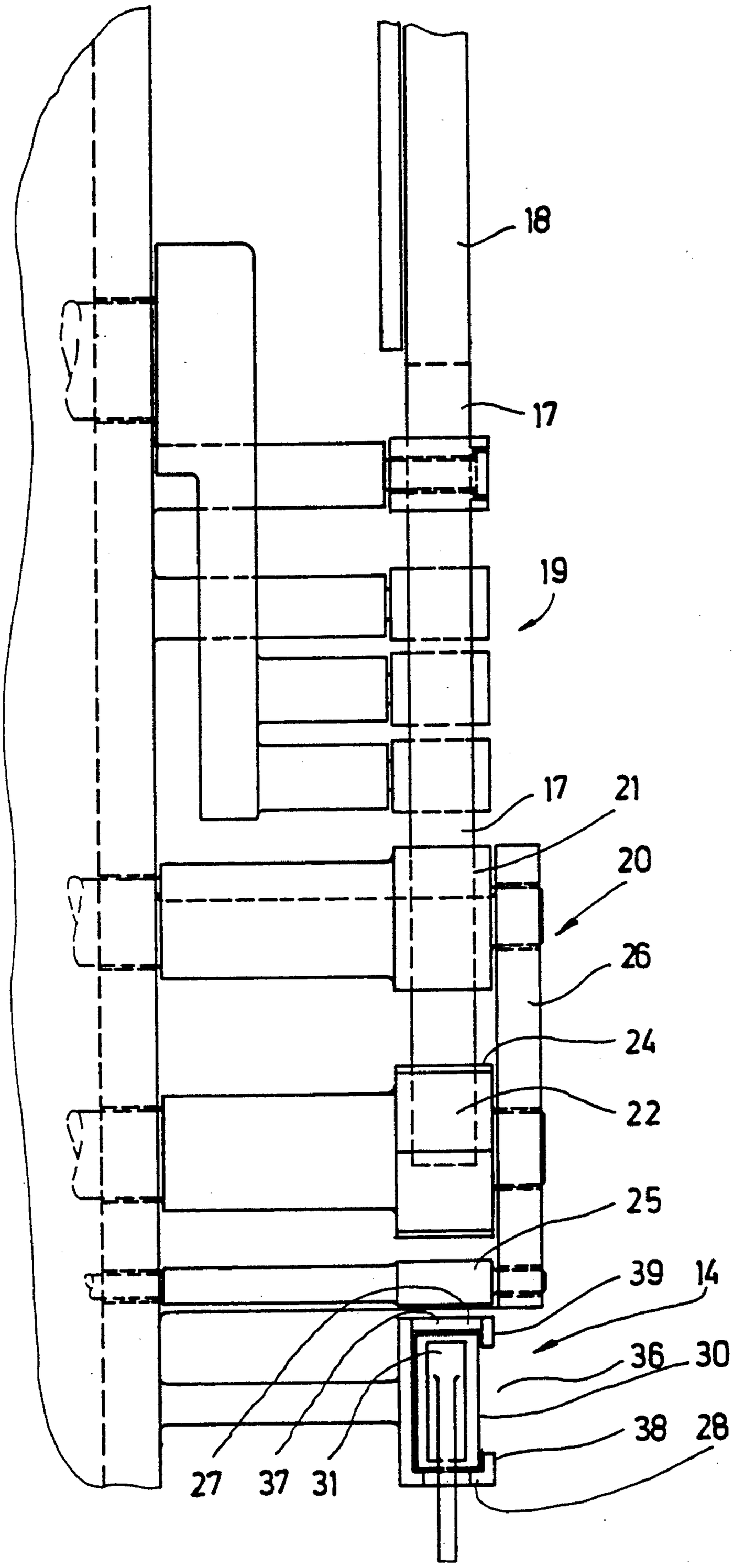


Fig. 2

Fig. 3



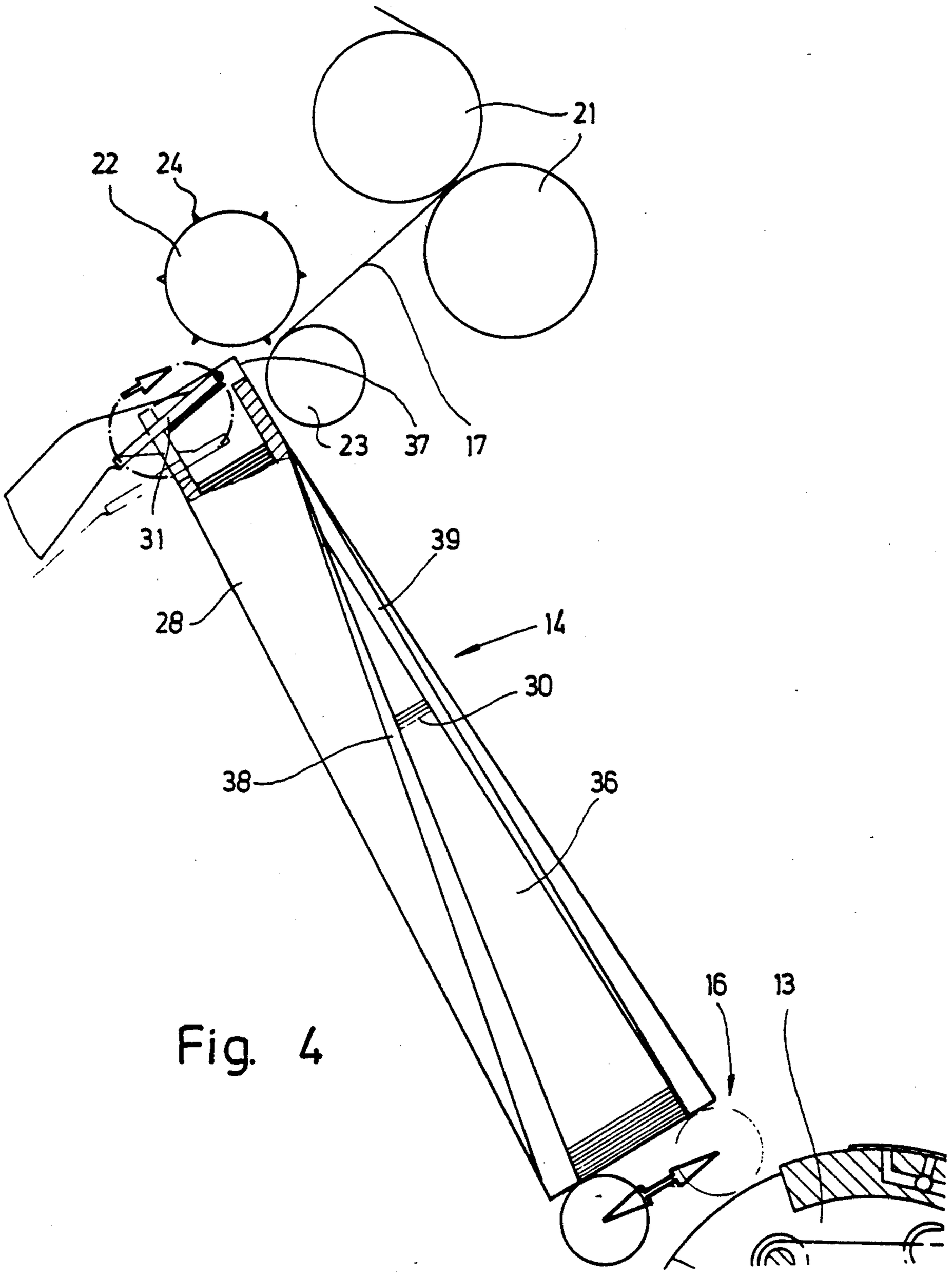


Fig. 4

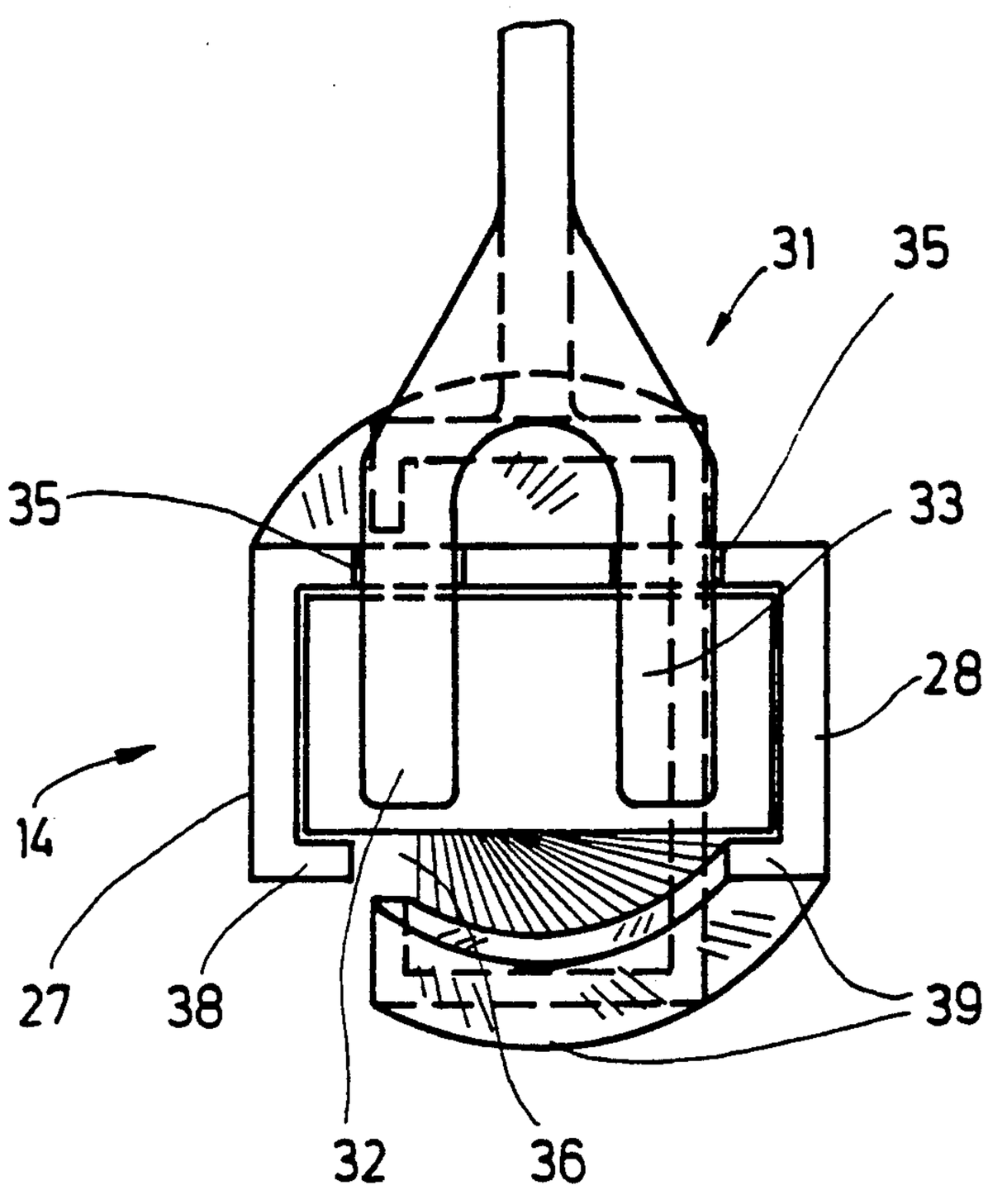


Fig. 5

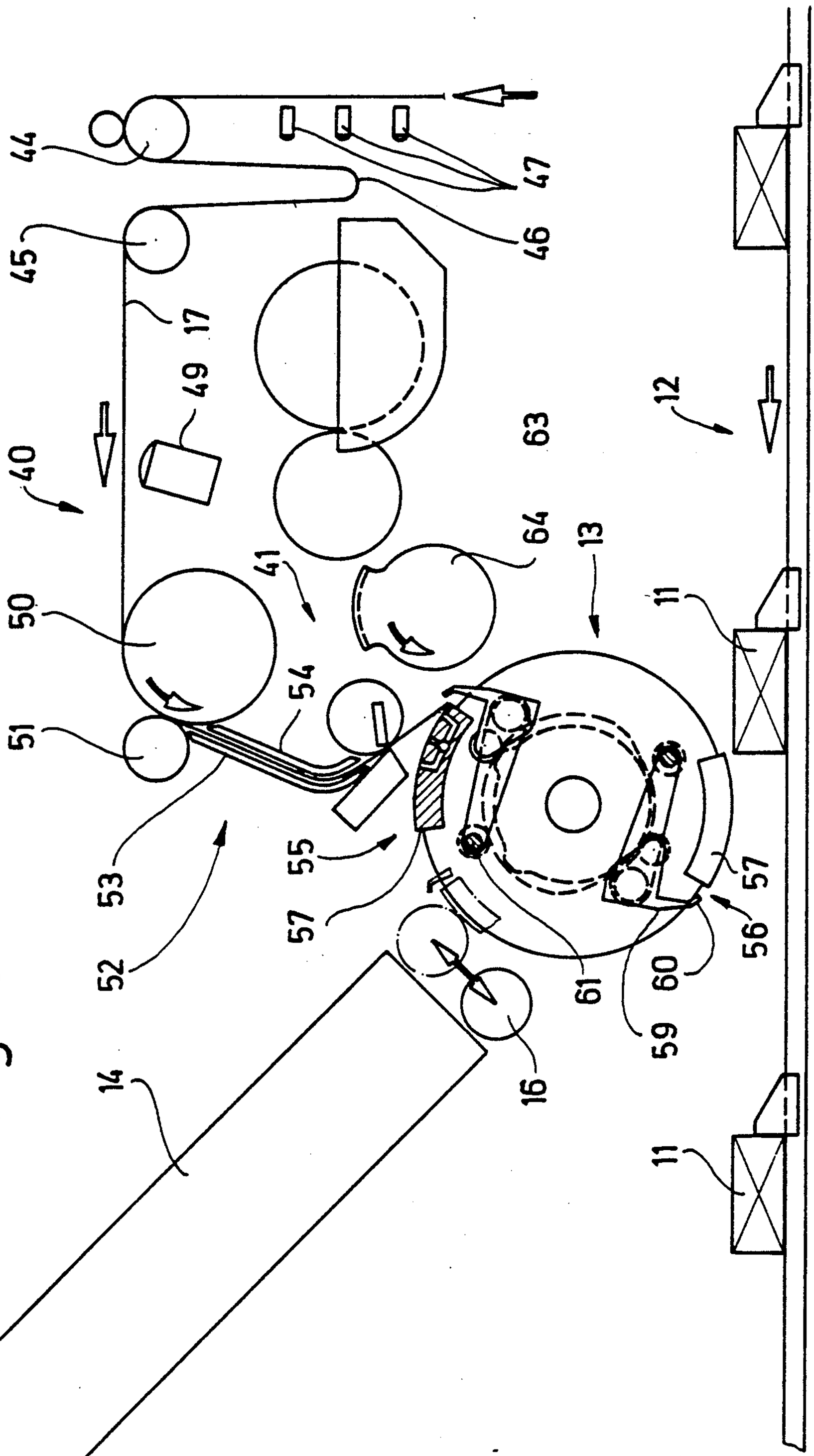

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Fig. 6

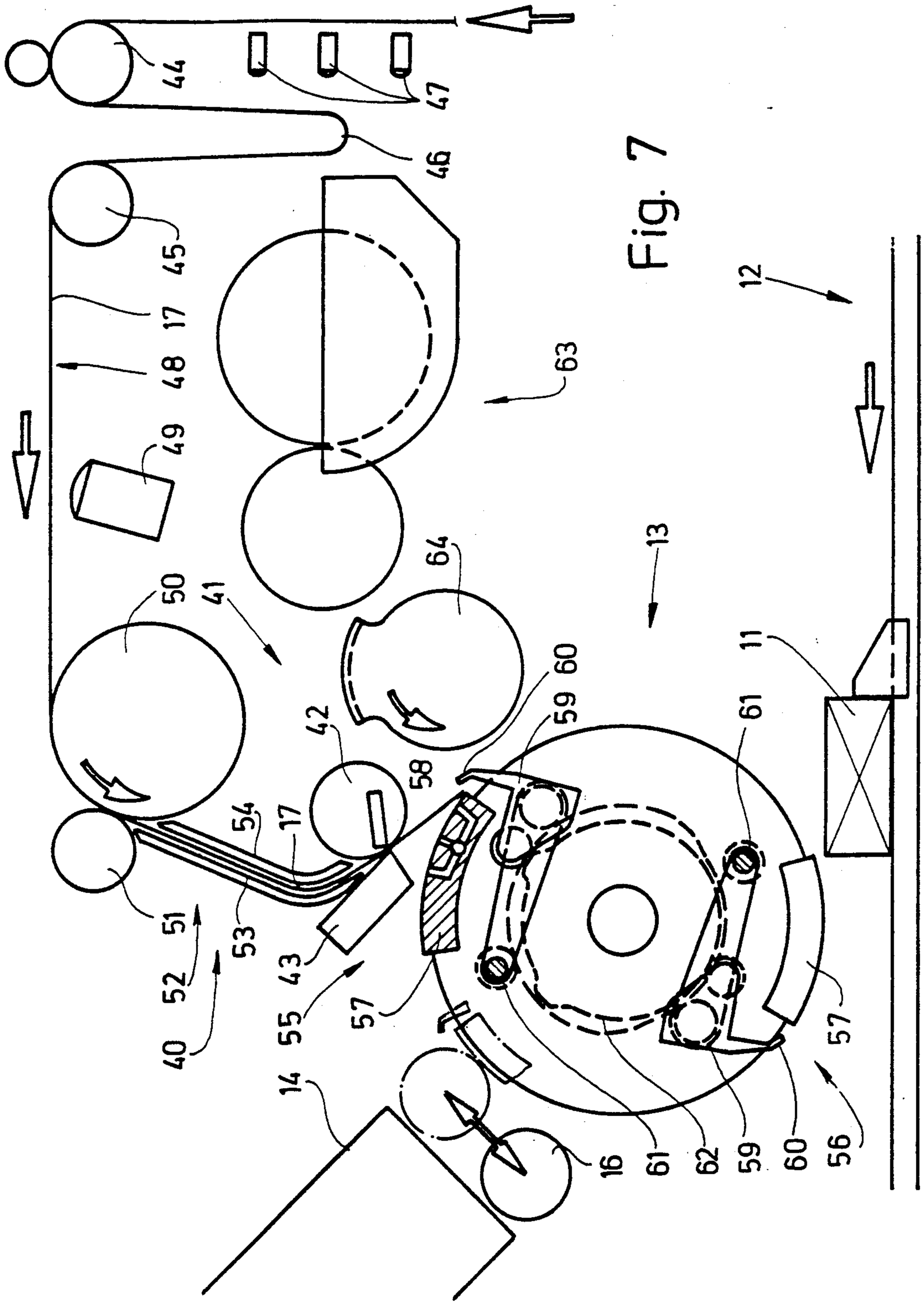
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Fig. 7

PROCESS AND APPARATUS FOR CONVEYING LABELS TO BE TRANSFERRED TO A (CIGARETTE) PACK

BACKGROUND OF THE INVENTION

The invention relates to a process for conveying (thin) blanks, especially labels, to be transferred to a (cigarette) pack, the blanks (labels) being successively severed from a continuous web of material and being conveyed into a postion ready for being received by the pack. Furthermore, the invention relates to an apparatus for conveying the blanks or labels.

In many fields of the packaging art arises the need of supplying blanks, stamps or labels, ready for being affixed to packs. In the production of cigarette packs, revenue stamps or closure labels have to be attached to the packs. In high-performance packaging machines, these labels have to be available and have to be attached to the packs in great numbers per unit of time. For taking over the labels, the packs are usually moved past a transfer means (label drum) where they receive and take along one label each.

The blanks or labels may be provided to the packaging machine in stacks as finished units. In this case, the blank stacks are manually introduced into a chute-like magazine located at the machine-side and are extracted from said magazine from below by means of extraction means (so-called transfer rollers) for being transferred to the label drum.

It is, however, also already known in the art to sever the blanks or labels from a web of material of a respective width and to feed the labels to the packs by a specific unit.

SUMMARY OF THE INVENTION

The invention is based on the object to propose measures for an efficient and high-performance feed of the blanks or labels to the packs, with a changeover to other types of labels being easily possible within a small amount of time.

To attain this object, the invention sets out from the idea to alternatively either sever the labels or revenue stamps in the region of the packaging machine from a continuous web of material and to feed them to the packs or to introduce labels finished somewhere else into a magazine in stacks and to extract the blanks from this magazine for being fed to the packs.

According to one embodiment of the invention, the blanks, after having been severed from the web of material, are individually conveyed into the magazine in succession and deposited on a stack formed therein.

Alternatively, a web of material from which the labels are to be formed is fed to a cutting unit arranged immediately adjacent to the label conveyor, especially adjacent to the periphery of the label drum. The severed blanks are in this case directly received by a holding unit of the label conveyor and are fed to a pack. In this embodiment too, a magazine is arranged in the region of the label conveyor for an alternative feed of labels which have been prefabricated somewhere else.

When the labels are produced by being severed from a web of material in the region of the packaging machine, a great capacity of material can be made available, since the web of material is supplied in large reels. Nevertheless, a change in the type of production and feed of the blanks is possible without wasting much time or work. No resetting work is needed, since the magazine is directly available for being fed with labels produced elsewhere.

If, according to the one alternative of the invention, the labels are conveyed into a magazine after having been severed from the web of material, this is expediently done as a continuation of the conveying movement of the web of material, with the severed blanks entering the magazine laterally in the upper region of the magazine. The blanks can be accelerated after being severed from the web of material, so that they can be fed into the magazine at a higher speed.

According to a further proposal of the invention, the magazine is designed such that the blanks are turned by 90° while moving downward therein. As a result, the blanks have a different relative position when they are taken over by the label drum compared to when they were severed form the a web of material.

If the labels are received by the label holder of the label conveyor immediately after or during the severing process, a further proposal of the invention suggests to provide an extremely accurate drive of the web of material, specifically by means of feed rollers driven by a stepping motor and being controllable via markings on the web of material.

Further features of the invention relate to the design of the magazine and the severing and conveying means for the blanks.

Exemplary embodiments of the invention will be described below in more detail with reference to the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic side view of an apparatus for producing and handling or conveying blanks (labels),

FIG. **2** shows a detail of the apparatus according to FIG. **1** on an enlarged scale,

FIG. **3** is a plan view of part of the apparatus according to FIG. **1**,

FIG. **4** shows a representation in analogy to FIG. **2** of another embodiment of the invention,

FIG. **5** is a top plan view of a magazine chute according to FIG. **4** on an enlarged scale,

FIG. **6** is a schematic side view in analogy to FIG. **1** of another embodiment of an apparatus.

FIG. **7** shows a detail of the apparatus according to FIG. **6** on an enlarged scale.

DESCRIPTION OF PREFERRED EMBODIMENTS

The embodiments shown in the drawings serve for feeding small rectangular blanks, namely labels **10**, to a cuboidal (cigarette) pack **11**. In the present embodiment, the labels **10** are to be placed on the top side of the pack **11**. For this purpose, the packs **11** are transported at a distance from one another along a rectilinear pack path by means of a drag conveyor **12**, with which the packs **11** are successively conveyed along the bottom side of a transfer means for the labels **10**. In the present embodiment, the labels **10** are placed on the packs **11** by a rotating label drum **13**. The labels **10** are held on the periphery of the label drum **13** by mechanic and pneumatic means until they are transferred to the pack **11**.

In the embodiment of FIGS. **1** to **5**, the labels **10** are extracted from a magazine **14** one after the other. Said magazine **14** is arranged above the label drum **13**, slightly offset thereto in an upright position. The longitudinal extension (longitudinal axis) of the magazine **14**

forms an acute angle with the vertical line, i.e. the magazine is arranged in a slightly inclined position.

At the bottom end, the magazine forms an extraction opening **15**, which in this case nearly corresponds to the inner cross-section of the magazine **14**. Below the extraction opening **15**, a blank extraction means is movably arranged, namely a transfer roller **16** of known construction.

The blanks or labels **10** are introduced into the magazine **14** at the top end thereof - opposite the extraction opening **15**. The labels **10** are successively severed (cut) from a web of material **17** whose width corresponds to the width of the rectangular labels **10**. The web of material **17** is continuously drawn off a voluminous reel **18** which is mounted in the transport plane of the web of material **17** or labels **10**. In relation to the packaging machine, which is not shown in detail, the reel **18** extends in a plane approximately parallel to the longitudinal mid-plane of the packaging machine, with the axis of rotation transverse thereto. Thus, the reel is arranged in a particularly space-saving manner.

The web of material **17** is drawn off the reel **18** and runs in several loops over a compensating looper **19** whose structure and funtion is already known in the art. Thereafter, the web of material **17** reaches a severing and feeding unit **20**. Here, the individual labels **10** are produced as a result of appropriate portions being severed from the web of material **17**.

In the embodiment according to FIGS. **1** and **2**, the severing and feeding unit **20** consists of a pair of drawing rollers **21** for drawing the web of material **17** off the reel **18**. The web of material **17** then arrives at a severing device which in this case consists of a knife roller **22** and a counter roller **23**. The knife roller **22** is provided with a plurality of severing knives **24** distributed at equal distances over the periphery of the roller **22**. Said severing knives **24** apply a severing cut every time they contact the web of material **17** fed through between the knife roller **22** and the counter roller **23**. In the present embodiment, one revolution of the knife roller **22** severs four labels **10** from the web of material.

On leaving the severing and feeding unit **20**, the labels **10** directly move into the adjacently arranged magazine **14**, either running at the conveying speed of the web of material or at an increased speed. Such an increase in the conveying speed of the labels **10** after they have been severed is effected in the embodiment of FIGS. **1** and **2** by acceleration rollers **25**, which are arranged on the severing and feeding unit **20**, specifically at an appropriate distance to knife roller **22** and counter roller **23**, such that the blank or label **10** is engaged immediately after being severed and is fed into the magazine **14** at increased speed.

The aforedescribed rollers **21, 22, 23, 25** of the severing and feeding unit are arranged on one or preferably two spaced supporting side plates **26** being connected to one another at the bottom end, so that the severing and feeding unit **20** forms an easy-to-handle unit.

The top part of the magazine **14** is designed in a special way. As is evident from FIG. **5**, the magazine **14** expediently has a C-shaped cross-sectional profile. The rectangular labels **10** are fed into the magazine **14** with their (imaginary) longitudinal axis pointing in the conveying direction, i.e. they are fed into the magazine **14** via a narrow side thereof. The conveying plane of the labels, which is predefined by the severing and feeding unit **20**, can be directed at an acute angle to the upper open side of the magazine **14**, such that the labels **10** are "shot" into the upwardly open magazine **14** in a slightly downwardly directed conveying plane. The magazine **14** is designed and arranged such that the blanks or labels **10** hit against a stop on the side located opposite the inlet side (side wall **27**), said stop being in this case formed by the opposite side wall **28**. This side wall **28** may expediently be provided with an elevation extending beyond the dimension defined by the side wall **27** in order to ensure a sufficient stop for the incoming blanks. In the embodiment according to FIGS. **1** and **2**, the labels **10** are thus introduced into the magazine via an upper inlet opening **29**, specifically by way of being laterally fed towards the magazine, transverse to its axis.

In the magazine **14**, the incoming labels **10** are deposited on a stack **30** formed within the magazine **14**. To ensure that the labels **10** are safely deposited in their proper position, a lowering means for the labels **10** is arranged in this upper region of the magazine **14**, namely a raisable and lowerable holding-down device **31**. In the embodiment of FIG. **3**, this holding-down device **31** consists of a simple plate which in the upper region of the magazine **14** enters the magazine **14** via a slot-shaped orifice in the side wall **28**. In the embodiment of FIGS. **4** and **5**, which will be described in more detail further below, the holding-down device **31** consists of two fingers **32, 33** which outside of the magazine **14** are connected to one another to form a forked unit. The holding-down device **31** engages the incoming labels **10** at their top side and downwardly conveys them in the magazine **14**. The holding-down device **31** is movable in a special way, namely along an oval path of motion **34**.

The holding-down device **31** with the forked design according to FIGS. **4** and **5** enters the magazine **14** with fingers **32, 33** via upwardly open slots **35** in the region of a (wider) rear wall. After a label **10** has been deposited, the fingers **32, 33** are withdrawn from the magazine **14**, so that the next label **10** can be introduced into the magazine **14** without any delay. Outside the magazine, the holding-down device **31** is moved back to an upper position and is reintroduced into the magazine **14** from above. The label **10**, which has been introduced into the magazine **14** during this returning movement of the holding-down device **31**, is now moved down onto the stack **30** by the subsequent downward movement of the holding-down device **31**.

As a result of its C-shaped profile, the magazine **14** is open at a longer side by being provided with a side opening **36** extending across the full height. Said side opening **36** is located in the region of a longer side dimension of the magazine. The width of the side opening **36** has been chosen large enough to allow a tool or hand to pass through, particularly for rectifying possible faults in the stacking of the labels **10**.

The embodiment of FIG. **4** comprises a more simplified feed of the web of material **17** via the drawing rollers **21** and the knife roller **22** with counter roller **23**. The latter two rollers are mounted immediately adjacent, i.e. at a small distance, to the upper end portion of the magazine **14**. The severed labels **10** are fed into the magazine **14** directly by a knife roller **22** and counter roller **23**. In this embodiment, the knife roller **22** is provided with a larger number of severing knives **24**, so that a respectively larger number of labels **10** is produced with each revolution.

In the entrance area of the labels **10**, the magazine **14** is designed such that an inlet opening **37** is formed in the

region of a lateral limitation (side wall) of the magazine **14**. Said lateral limitation is recessed relative to an upper edge and particularly in relation to an opposite side wall **28**, so that a free and upwardly open inlet opening **37** for the lateral introduction of labels **10** into the magazine **14** is formed.

In the embodiment of FIG. **4**, this inlet opening **37** is formed in the region of a wider transverse dimension of the magazine. The rectangular oblong labels **10** are thus severed from the correspondingly wide web of material **17** in such a way that they are directed with their longitudinal extension transverse to the conveying direction. This means that the labels **10** are severed from the web of material **17** breadthways and are inserted via the broad side into the magazine **14** in a corresponding relative position, in this case at the side of side opening **36**.

Because the labels **17** have to be extracted in the longitudinal direction thereof at the bottom side of the magazine **14**, this embodiment provides for a turning movement of the labels **10** while they are moving downward within the magazine **14**. Consequently, the labels **10** are extracted from the magazine by means of the transfer roller **16** in a position which is offset by 90° relative to the upper introducing position.

For this purpose, the magazine **14** is designed such that the side walls **27**, **28** and side panels **38**, **39** for limiting the side orifice **36** are helically twisted, such that in the upper region, especially at the inlet opening **37**, the larger dimension of the magazine (side orifice **36**) is facing towards the arriving labels **10**, while the same side of the magazine is turned by 90° in the bottom region as a result of the twisted form. Since the stacked labels **10** are guided in their gradual downward movement within the magazine by the side walls **27**, **28** and the panels **38**, **39**, a respective turning movement of the labels **10** in their plane is automatically effected.

It is not necessary to change over the reels etc. for a different type (model) of label. For a merely temporary change of labels, the magazine **14** can instead be manually filled by introducing stacks of labels into the upwardly open magazine **14**, without any refitting work.

In the embodiment according to FIGS. **6** and **7**, the production and feed of the labels **10** is conducted by severing the labels **10** from the web of material **17** independently of the (conventionally designed) magazine **14**. Into this magazine, labels **10** produced elsewhere can be inserted in stacks.

In this embodiment, the production and feeding of the blanks or labels **10** by severing the labels **10** from the web of material **17** is conducted by a separate label unit **40**. This unit **40** comprises a cutting unit **41** for severing the individual labels **10** from the web of material **17**. The cutting unit **41** is arranged directly adjacent to the label drum **13**, such that the severed labels **10** are directly received and conveyed further by the label drum **13**. The cutting unit consists of a rotating knife roller **42** and a stationary counter knife **43**.

The web of material coming from a reel (not shown) forms a loop of material **46** (sag) between deflecting rollers **44**, **45**, said loop acting as a variable web reservoir. The size of the loop of material **46** is monitored, in the present case by means of optoelectric sensors **47** which control the drive of the deflecting roller **44** and therewith the feed of the web of material **17**.

The deflecting roller **45** is followed by a horizontal conveying portion **48** of the web of material **17**. Within this portion **48**, the web of material, in particular exactly positioned control markings thereof, is scanned. For this purpose, a known optoelectric scanning means **49** is provided.

At the end of the horizontal conveying portion **48**, the web of material **17** runs over feed rollers **50**, **51**. These are driven very precisely, such that the portion of the web of material **17** following in the conveying direction is subjected to a very accurate feed. The feed rollers **50**, **51** are preferably driven by a stepping motor (not shown) whose movements are controlled by the scanning means **49** and therewith in response to the control markings on the web of material **17**.

Downstream of the feed rollers **50**, **51**, the web of material **17** is fed towards the cutting unit **41** along a conveying portion which is essentially downwardly directed. In the area between the feed rollers **50**, **51** and the cutting unit **41**, the web of material **17** is exactly guided, specifically by means of a rigid track guide **52**. Said track guide **52** consists of two guide walls **53**, **54** arranged at a small distance on both sides of the web of material **17**.

In the lower region, the track guide **52** changes direction in a curved manner, such that a portion of the web of material facing towards the label drum **13** and the cutting unit **41** is directed at an acute angle relative to the periphery of the label drum **13**.

In the present embodiment, the label drum **13** is provided with two label holders **55**, **56** located diagonally opposite one another. These holders **55**. **56** each consist of a contact member **57** for the label, projecting from the peripheral surface of the label drum **13** in the radial direction. An outer contact surface of this contact member **57** is curved, concentrically relative to the label drum **13**. In a forward region with respect to the conveying direction, suction bores **58** open out into the contact surface of the contact member **57**, said suction bores being connected to a central vacuum source by means of suction channels. Suction air is applied to the suction bores **58** when a label **10** is taken over and during transport thereof.

Furthermore, the label holder **55**, **56** is associated with a mechanical holding means for engaging and holding an end portion of the label **10** which is forwardly located relative to the conveying direction. In the present embodiment, this holding means is in the form of a clamping finger **59** having a slightly bent clamping end **60**. In clamping position, this clamping end **60** rests against the forward region of the contact member **57**, relative to the direction of rotation of the label drum **13**, and thus clamps the front end of the label **10**. The clamping finger **59** is designed as a bent two-armed lever, which is pivotally movable to an opening position (as shown in FIGS. **6** and **7**) and a clamping position. For this purpose, a free end of the clamping finger **59** runs on an appropriately formed cam disc **62** with a tracer roller **61**. The opening and clamping positions are determined by the form of the cam disc **62**.

The cutting unit **41** is arranged immediately adjacent to the periphery of the label drum **13**, specifically such that the web of material **17** moves onto the label holder **55**, **56** before the label **10** is severed. Before the severing cut is applied, the front end of the web of material **17** is already fixed on the label holder **55**, **56**, specifically by means of the clamping finger **59** moving in clamping position. At the time the severing cut is applied immediately thereafter, the label **10** is already held on the label drum **13**.

A gluing unit **63** is arranged such, that a glue segment **64** transfers glue strips onto the outwardly directed face of the label **10** when the latter rests on the label holder **55, 56**, directly downstream of the cutting unit **41**.

What is claimed is:

1. A process for conveying blanks to be transferred to packs, said blanks being successively severed from a continuous web of material and being conveyed into a position ready for being received by the packs, characterized in that:

the blanks (**10**), after being severed from the web of material (**17**), are individually conveyed in succession into a chute-like magazine and are extracted therefrom for being transferred to the packs (**11**); and

the blanks (**10**), severed from the web of material (**17**) and fed into the magazine (**14**) transverse to their longitudinal extensions, are turned during a downward movement in the magazine (**14**), such that each blank (**10**) is extractable at a bottom side of the magazine (**14**) with its longitudinal extension pointing in the conveying direction.

2. The process as claimed in claim **1**, wherein said blanks (**10**), immediately after being severed from the web of material (**17**), are individually feedable into the magazine (**14**) and depositable on a blank stack (**30**) therein by means of being conveyed in a direction essentially horizontal or downwardly inclined at a very acute angle and transverse to a longitudinal extension of said magazine (**14**).

3. The process as claimed in claims **1** or **2**, wherein the blanks (**10**), after being severed from the web of material (**17**), are accelerated in the conveying direction and are laterally fed into the magazine (**14**) at increased speed.

4. An apparatus for conveying labels to packs in the region of a packaging machine, said labels being successively severed from a web of material and being transportable by a label conveyor (**13**) to a position ready for being received by the successively supplied packs (**11**), characterized in that:

the labels (**10**), after being severed from the web of material (**17**), are directly feedable into a magazine (**14**) and are stackable therein, the labels (**10**) being fed into said magazine (**14**) at a top side thereof and being individually extractable at a bottom side thereof; and

rectangular labels (**10**) are severable from the web of material (**17**) in a position in which the longitudinal extension of said labels (**10**) is transverse to said web of material (**17**); and

the labels (**10**) are feedable into the magazine (**14**) in this transverse position, each label (**10**) being turnable by 90° C. during downward movement within said magazine (**14**) and being extractable from the magazine (**14**) with its longitudinal extension pointing in the conveying direction.

5. The apparatus as claimed in claim **4**, wherein the limitations of the magazine (**14**), are twisted in a screwthread-like manner, such that in the case of a rectangular cross-section of the magazine (**14**), the longitudinal extension in the upper region is directed transverse to the feed direction of the labels (**10**) and in the lower region is directed in the conveying direction of the labels (**10**).

6. The apparatus as claimed in claim **4**, wherein a cutting unit (**41**), for severing labels from the web of material, is arranged at an exit side of a stationary track guide (**52**) for the web of material (**17**), said track guide (**52**) comprising guide walls (**53, 54**) arranged at a small distance from one another.

7. The apparatus as claimed in claim **6**, wherein the web of material (**17**) is feedable to the cutting unit (**41**) by means of feed rollers (**50, 51**) driven by a stepping motor, said stepping motor being controllable in response to exact markings of the web of material (**17**).

8. The apparatus as claimed in claim **7**, wherein the track guide (**52**) follows the feed rollers (**50, 51**) in downward direction and extends in a curved change of direction towards the cutting unit (**41**), such that the web of material (**17**) or the severed label (**10**) are directed at an acute angle relative to a peripheral surface of the label conveyor (**13**).

9. The apparatus as claimed in claim **8**, wherein an end portion of the web of material (**17**) projecting from the track guide (**52**) is directed in the direction of a label holder (**55, 56**).

10. The apparatus as claimed in claim **4**, wherein the same label conveyor (**13**) is associated with a stationary magazine (**14**) for holding a stack of labels (**10**) and for passing these labels to the label conveyor (**13**), and for providing an alternative feed of the label conveyor (**13**) with labels (**10**) upstream of the cutting unit (**41**) relative to the conveying direction.

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